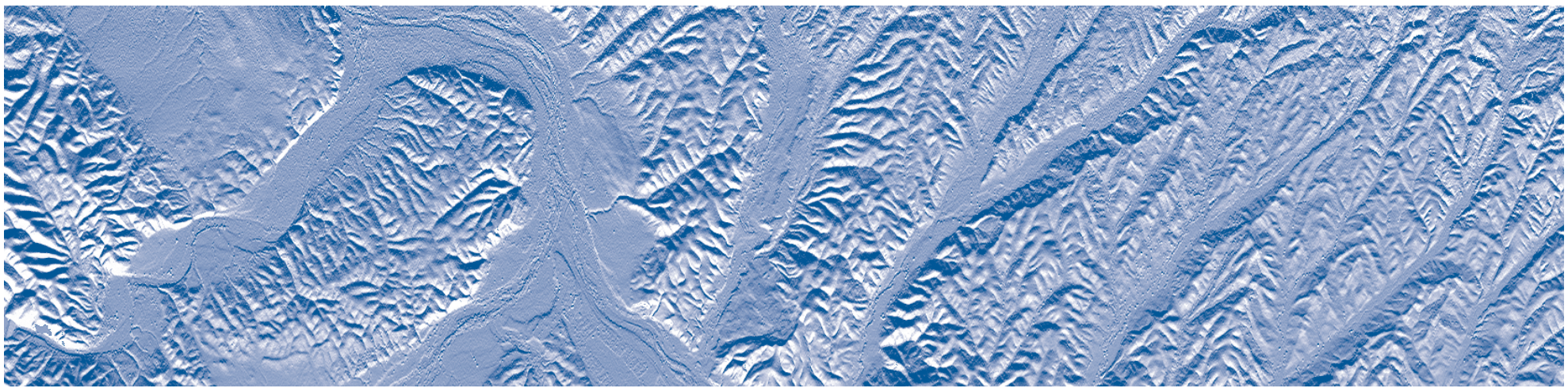
STS-99 to demonstrate new mapping technology



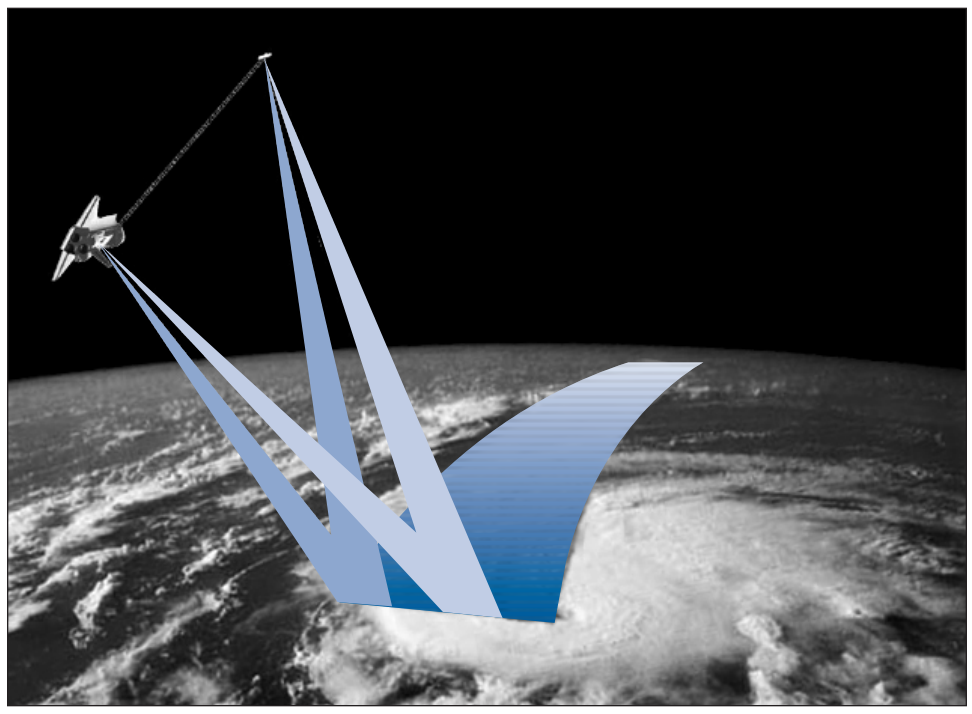
This image shows a region of central California centered at Camp Roberts, near Parkfield, CA, a region of great interest to seismologists because of its frequent earthquake activity. The area is a site of intensive topographic mapping that will be used by the Shuttle Radar Topography Mission project to compare its data against other topographic data sets. The terrain consists of rolling grassy hills and groves of heritage oaks. The river valleys to the left in the image are formed from the confluence of the Salinas, San Antonio and Nacimiento rivers.

Flying backward around the globe with two antennae and a 200-foot-long section of space station mast protruding from its payload bay, the Space Shuttle *Endeavour* and crew will attempt to produce unrivaled 3-D images of the Earth's surface in January.

The result could be close to 1 trillion measurements of the Earth's topography. Besides contributing to the production of better maps, these measurements could lead to improved water drainage modeling, more realistic flight simulators, better locations for cell phone towers, and enhanced navigation safety.

Just about any project that requires accurate knowledge of the shape and height of the land can benefit from the data. Some examples are flood control, soil conservation, reforestation, volcano monitoring, earthquake research, and glacier movement monitoring. The measurements, which once processed are expected to be accurate to within 50 feet, may be tailored to meet the needs of the military, civil, and scientific user communities.

Creating these 3-D images of the Earth's surface on STS-99, known as the Shuttle Radar Topography Mission, will require the first on-orbit use of a technique called single-pass radar interferometry. Two radar images will be bounced off the surface simultaneously – one by the same C-band and X-band radar antennas used to take radar images from the shuttle's payload bay on STS-59 and STS-68, and another similar antenna at the end of the 60-meter mast extending perpendicular from the payload bay.



Building and deploying the mast, which is two-thirds as long as the International Space Station will be when complete, will be a significant accomplishment in itself. Extending the longest rigid structure ever flown in space – stored accordion-style inside a canister attached to the side of the main antenna – will require the first use of a new shuttle piloting technique called the "flycast maneuver." The maneuver, practiced on STS-93, will help reduce structural loads on the mast.

The power needed to operate the radar antennae and associated equipment pushes the edge of the shuttle's generating capability for the 11-day flight. A total of 900 Kilowatt-hours (enough to power a typical home for 2-3 months) will be needed.

All data will be recorded on board the shuttle using Payload High Rate Recorders – enough to fill 15,000 CDs. Small slices of data will be downlinked to Earth for developers from NASA's Jet Propulsion Laboratory to study during the flight, but they can be downlinked at only a quarter of the speed they are recorded.

Endeavour will be launched in an orbit with an inclination of 57 degrees to allow the entire land surface that lies between 60 degrees north and 56 degrees south latitude to be covered, which includes the majority of the Earth's populated surface area.

Commander Kevin Kregel will lead the mission, making his fourth flight. Dominic Gorie will serve as pilot, making his second flight. Mission Specialists Janet Kavandi (second flight), Mamoru Mohri of the National Space Development Agency of Japan (second flight), and Gerhard Thiele of the European Space Agency (first flight) round out the crew.

Intercenter, interagency and international cooperation are hallmarks of the mission. It is a joint project of NASA, the Defense Department's National Imagery and Mapping Agency, the German Aerospace Center, and the Italian Space Agency. ■

JSC to sponsor second annual Mars Settlement Design Competition

Building on the success of the February 1999 initial JSC Mars Settlement Design Competition, JSC will sponsor the event for a second year February 11 - 13, 2000.

The second annual Mars Settlement Design Competition will bring high school students to JSC for an intensive overnight weekend program in which they will compete in the design of a future human Mars base. "We are looking forward to another stellar educational experience for the students," says this year's chair, Nancy Robertson, chief of the Education and Community Support Branch of the Public Affairs Office.

Students with a variety of skills will be teamed with others to form four competing student companies. Up to 120 students will be able to take part in the competition. Students need not be science and technology focused to enjoy the competition. It takes a wide variety of people, talents and skills to prepare a design and proposal for a project this large. Analysts, planners, artists, writers, organizers, managers, communicators, and others with imagination and creativity will be needed by each student company.

Each company will be provided with a professional NASA or industry manager to serve as CEO and to guide the students in their processes. The students will receive all the training, guidance and information needed to prepare a winning design and proposal as part of the competition activities. The competition concludes with each student company's presentation of its proposal to a panel of NASA and industry judges, who select the winning proposal.

Students who participate in this competition will learn much about Mars, space science, the space environment, engineering and business careers, organizing, integration of complex activities, teamwork, management, and effective communications, all set in an exciting and unusual context.

The competition is being held as part of JSC's National Engineers Week activities.

If you have family members or friends who are high school students and who would be interested in participating in this competition, you may contact Norman Chaffee, competition coordinator, AP2, at (281) 483-3777 for more information and an application form. ■

Volunteers needed for Engineers Week 2000

JSC is proudly participating for a 9th consecutive year in National Engineers Week and needs your participation to make this popular educational outreach program a continued success. With the volunteer participation of some 175 JSC civil service employees and the contractor community, more than 18,000 area students and teachers had space-related classroom presentations during the 1999 National Engineers Week program.

National Engineers Week is an annual event to help raise public awareness and appreciation of engineers and their work. More than three million engineers, teachers, and students will participate nationwide. As part of the Discover "E" ("E" for Engineering) program, JSC civil service and contractor engineers and other employees will visit classrooms to show students how math, science, and engineering create the world around them and to introduce them to technical careers. With declining enrollment figures in the engineering fields, National Engineers Week offers a great opportunity for each of us to contribute to our community's technical education efforts.

Volunteers are asked to commit to giving classroom presentations to students that attend grades K-12 in schools within 50 miles of JSC anytime during the month of February. For civil service employees, time spent participating as a National Engineers Week volunteer may be charged to the education labor code. Contractor employees need to check with their individual supervisor, human resource or payroll offices for instructions on how to charge National Engineers Week volunteer time.

JSC's Education Outreach Program will host Volunteer Training Sessions January 25-28, 2000, from 10-11 a.m. daily, in Bldg. 17 Rm. 242, that will include a panel of veteran volunteers and former teachers who will discuss presentation tips and demonstrate hands-on activities for use in the classroom. Also, access to resources such as exhibits, videos, and promotional materials will be discussed.

Individuals interested may sign up and select classroom assignments online by visiting JSC's National Engineers Week Web site at http://www4.jsc.nasa.gov/scripts/eweek/ ■